

WHAT IS CLAIMED IS:

1. A wavelength selector switch comprising:
 - a first optical input port to which a first wavelength-multiplexed light beam with a first polarization angle is input;
 - 5 a second optical input port to which a second wavelength-multiplexed light beam with a second polarization angle is input;
 - a first optical output port;
 - a second optical output port;
 - 10 a first refracting plate that refracts the second wavelength-multiplexed light beam at a refraction angle;
 - an optical splitter that spatially splits into a plurality of wavelength components the first wavelength-multiplexed light beam and the second wavelength-multiplexed light beam refracted, respectively;
 - 15 a first optical system that changes the wavelength components into parallel light beams;
 - a polarization controller that selectively changes a polarization angle of each of the parallel light beams between the first and second polarization angles, and passes the parallel light beams;
 - 20 a second optical system that condenses the parallel light beams which are passed through the polarization controller;
 - an optical coupler that multiplexes into a third wavelength-multiplexed light beam the parallel light beams condensed; and
 - 25 a second refracting plate that refracts wavelength components,

of the third wavelength-multiplexed light beam, having the second polarization angle at a refraction angle to direct the wavelength components having the second polarization angle to the second optical output port and to direct wavelength components, of the third
5 wavelength-multiplexed light beam, having the first polarization angle to the first optical output port.

2. The wavelength selector switch according to claim 1, wherein the polarization controller is a magneto-optic element array.

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3. The wavelength selector switch according to claim 1, wherein the polarization controller is a liquid crystal unit.

4. The wavelength selector switch according to claim 1, wherein
15 each of the optical splitter and the optical coupler is a diffraction grating.

5. The wavelength selector switch according to claim 1, wherein each of the optical splitter and the optical coupler is a virtually imaged
20 phase array.

6. The wavelength selector switch according to claim 1, wherein each of the first and second refracting plates is a polarization beam splitter.

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7. A wavelength selector switch comprising:
- a first optical input/output port to which a first wavelength-multiplexed light beam with a first polarization angle is input;
 - 5 a second optical input/output port to which a second wavelength-multiplexed light beam with a second polarization angle is input;
 - a refracting plate that refracts the second wavelength-multiplexed light beam at a refraction angle;
 - 10 an optical splitter/coupler that spatially splits into a plurality of wavelength components the first wavelength-multiplexed light beam and the second wavelength-multiplexed light beam refracted, respectively;
 - an optical system that changes the wavelength components into parallel light beams; and
 - 15 a polarization controller that selectively changes a polarization angle of each of the parallel light beams between the first and second polarization angles, and reflects the parallel light beams, wherein
 - the optical system condenses on the optical splitter/coupler the parallel light beams reflected,
 - 20 the optical splitter/coupler multiplexes into a third wavelength-multiplexed light beam the parallel light beams condensed, and
 - the refracting plate refracts wavelength components, of the third wavelength-multiplexed light beam, having the second polarization
 - 25 angle at a refraction angle to direct the wavelength components having

the second polarization angle to the second optical input/output port and to direct wavelength components, of the third wavelength-multiplexed light beam, having the first polarization angle to the first optical input/output port.

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8. The wavelength selector switch according to claim 7, wherein the polarization controller is a magneto-optic element array.

9. The wavelength selector switch according to claim 7, wherein
10 the polarization controller is a liquid crystal unit.

10. The wavelength selector switch according to claim 7, wherein the optical splitter/coupler is a diffraction grating.

15 11. The wavelength selector switch according to claim 7, wherein the optical splitter/coupler is a virtually imaged phase array.

12. The wavelength selector switch according to claim 7, wherein the refracting plate is a polarization beam splitter.

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13. A wavelength selector switch comprising:
a first optical input port to which a first wavelength-multiplexed light beam with a first polarization angle is input;
a second optical input port to which a second

25 wavelength-multiplexed light beam with a second polarization angle is

input;

a first optical output port;

a second optical output port;

a refracting plate that refracts the second

5 wavelength-multiplexed light beam at a refraction angle;

an optical splitter/coupler that spatially splits into a plurality of wavelength components the first wavelength-multiplexed light beam and the second wavelength-multiplexed light beam refracted, respectively;

an optical system that changes the wavelength components into
10 parallel light beams; and

a polarization controller that selectively changes a polarization angle of each of the parallel light beams between the first and second polarization angles, and reflects the parallel light beams, wherein

the optical system condenses on the optical splitter/coupler the
15 parallel light beams reflected,

the optical splitter/coupler multiplexes into a third wavelength-multiplexed light beam the parallel light beams condensed, and

the refracting plate refracts wavelength components, of the third
20 wavelength-multiplexed light beam, having the second polarization angle at a refraction angle to direct the wavelength components having the second polarization angle to the second optical output port and to direct wavelength components, of the third wavelength-multiplexed light beam, having the first polarization angle to the first optical output port.

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14. The wavelength selector switch according to claim 13, wherein the polarization controller is a magneto-optic element array.
15. The wavelength selector switch according to claim 13, wherein the polarization controller is a liquid crystal unit.
16. The wavelength selector switch according to claim 13, wherein the optical splitter/coupler is a diffraction grating.
17. The wavelength selector switch according to claim 13, wherein the optical splitter/coupler is a virtually imaged phase array.
18. The wavelength selector switch according to claim 13, wherein the refracting plate is a polarization beam splitter.
19. The wavelength selector switch according to claim 13, wherein the optical system is arranged so that an incident angle of the parallel light beams with respect to the polarization controller is equal to a reflection angle of the parallel light beams with respect to the polarization controller.
20. A wavelength selector switch comprising:
a first optical input/output port to which a first wavelength-multiplexed light beam is input;
a second optical input/output port to which a second

wavelength-multiplexed light beam is input;

5 a first refracting plate that guides the first wavelength-multiplexed light beam having a first polarization angle to a first optical path, guides the first wavelength-multiplexed light beam having a second polarization angle to a second optical path by refracting the first wavelength-multiplexed light beam at a first refraction angle, passes the second wavelength-multiplexed light beam having the first polarization angle, and refracts the second wavelength-multiplexed light beam having the second polarization angle at the first refraction
10 angle;

a wavelength plate that changes into the first polarization angle a polarization angle of the first wavelength-multiplexed light beam refracted, and changes into the second polarization angle a polarization angle of the second wavelength-multiplexed light beam not refracted;

15 a second refracting plate that refracts the second wavelength-multiplexed light beam changed by the wavelength plate at a second refraction angle to guide the second wavelength-multiplexed light beam to the first optical path, and refracts the second wavelength-multiplexed light beam not changed by the wavelength plate
20 at the second refraction angle to guide the second wavelength-multiplexed light beam to the second optical path;

an optical splitter/coupler that spatially splits the light beams propagating on the first and second optical paths into a plurality of wavelength components;

25 an optical system that changes the wavelength components into

parallel light beams; and

a polarization controller that selectively changes a polarization angle of each of the parallel light beams between the first and second polarization angles, and reflects the parallel light beams controlled,

5 wherein

the optical system condenses on the optical splitter/coupler the parallel light beams reflected,

the optical splitter/coupler multiplexes into a third wavelength-multiplexed light beam the parallel light beams on the first
10 optical path from the optical system, and multiplexes into a fourth wavelength-multiplexed light beam the parallel light beams on the second optical path from the optical system,

the second refracting plate refracts wavelength components of the third and fourth wavelength-multiplexed light beams which have the
15 second polarization angle, at the second refraction angle,

the wavelength plate changes into the first polarization angle a polarization angle of the wavelength components of the third wavelength-multiplexed light beam refracted, and changes into the second polarization angle a polarization angle of the wavelength
20 components of the fourth wavelength-multiplexed light beam not refracted, and

the first refracting plate refracts the fourth wavelength-multiplexed light beam refracted by the second refracting plate, at the first refraction angle to guide the fourth
25 wavelength-multiplexed light beam to the first input/output optical port,

and refracts the third wavelength-multiplexed light beam refracted by the second refracting plate, at the first refraction angle to guide the third wavelength-multiplexed light beam to the second input/output optical port.

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21. The wavelength selector switch according to claim 20, wherein the first refraction angle is perpendicular to the second refraction angle.

22. The wavelength selector switch according to claim 20, wherein
10 the polarization controller is a magneto-optic element array.

23. The wavelength selector switch according to claim 20, wherein the polarization controller is a liquid crystal unit.

15 24. The wavelength selector switch according to claim 20, wherein the optical splitter/coupler is a diffraction grating.

25. The wavelength selector switch according to claim 20, wherein the optical splitter/coupler is a virtually imaged phase array.

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26. The wavelength selector switch according to claim 20, wherein each of the first and second refracting plates is a polarization beam splitter.

25 27. The wavelength selector switch according to claim 20, wherein

the optical system is arranged so that an incident angle of the parallel light beams with respect to the polarization controller is equal to a reflection angle of the parallel light beams with respect to the polarization controller.

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